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IS 5556 (1991): Serrated Lock Washers [PGD 31: Bolts, Nuts and Fasteners Accessories]



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भारतीय मानक
दाँतेदार लॉक वाशर — विशिष्ट
(पहला पुनरीक्षण)
Indian Standard
SERRATED LOCK WASHERS —
SPECIFICATION
(*First Revision*)

UDC 621.882.54

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

April 1991

Price Group 2

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Bolts, Nuts and Fasteners Accessories Sectional Committee had been approved by the Light Mechanical Engineering Division Council.

Tooth lock washers and serrated lock washers are primarily intended to establish electric contact in cases where the screwed parts are coated with non-conducting lacquer and similar coatings. If such washers together with bolts and nuts of low property classes are used to prevent unscrewing, then the suitability for this purpose shall be proved in each case.

This standard was originally published in 1970.

Following changes have been made in this revision:

- a) The nominal sizes are changed to respective threaded fastener size.
- b) The clearance hole diameters for Types A and B have been changed to clearance hole sizes of medium series as per IS 1821 : 1987. Dimensions for clearance holes for bolts and screws (*third revision*)
- c) Technical supply conditions newly added.
- d) Tests have been newly added.
- e) The contents have been upgraded to have rationalized sizes with some sizes added and some sizes deleted.
- f) In the material clause, stainless steel has been added.

In the preparation of this standard assistance has been derived from DIN 6798-1988 Serrated lock washers, issued by DIN.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed and calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SERRATED LOCK WASHERS — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This Indian Standard covers the requirements for serrated lock washers for threaded fasteners sizes in the range M 1.6 to M 30.

2 REFERENCES

2.1 The following Indian Standards are necessary adjuncts to this standard.

IS No.	Title
28 : 1985	Phosphorbronze ingots and castings (<i>fourth revision</i>)
1501 (Part 1) : 1984	Method for Vickers hardness test for metallic materials: Part 1 HV 5 to HV 100
4072 : 1975	Steel for springs washers (<i>first revision</i>)
5369 : 1975	General requirements for plain washers and lock washers (<i>first revision</i>)
6821 : 1973	Methods for sampling non-threaded fasteners

3 TYPES

3.1 The serrated lock washers for threaded fasteners shall be of the following three types:

- Type A — Externally toothed
- Type B — Internally toothed
- Type C — Countersunk externally toothed

4 GRADES

4.1 The serrated lock washers shall conform to precision grade of IS : 5369 : 1975.

5 DIMENSIONS

5.1 The dimensions for Type A and Type B serrated lock washers shall be as given in Table 1.

5.2 The dimensions for Type C serrated lock washers shall be as given in Table 2.

6 MATERIAL

6.0 The serrated lock washers shall be made from suitable spring steel conforming to IS 4072 : 1975 or phosphur bronze to IS 28 : 1985 or stainless steel.

6.1 Hardness

For Spring Steel Washers — It shall be hardened

and tempered to HV 430 to 530 tested in accordance with IS 1501 (Part 1) : 1984.

7 DESIGNATION

7.0 The serrated lock washers shall be designated by the nomenclature, type, nominal size, number of this standard and material.

7.1 A serrated lock washer of Type A, nominal size 5.0 mm and made of spring steel shall be designated as:

Serrated Lock Washer A 5 IS 5556 — Spring Steel

7.1.1 If the serrated lock washers are required for fasteners with left hand threads, the designation shall be as under:

Serrated Lock Washer A5 LH IS 5556 — Spring Steel

7.1.2 If the serrated lock washers are required to be phosphated, the letter 'P' shall be added at the end of the designation:

Serrated Lock Washer A 5 IS 5556 — Steel — P

8 TECHNICAL SUPPLY CONDITIONS

8.1 Finish

The serrated lock washer shall be supplied in natural black finish unless otherwise specified by the purchaser. At the request of the purchaser, the serrated lock washer may be phosphated, tinned, galvanized, nickel plated, copper plated, cadmium plated, etc.

8.2 Plated lock washers shall be stress relieved after plating to avoid hydrogen embrittlement and shall be subjected to an embrittlement test (*see 9.3*).

8.3 General Requirements

8.3.1 The surfaces of washers shall be free from scales and burrs.

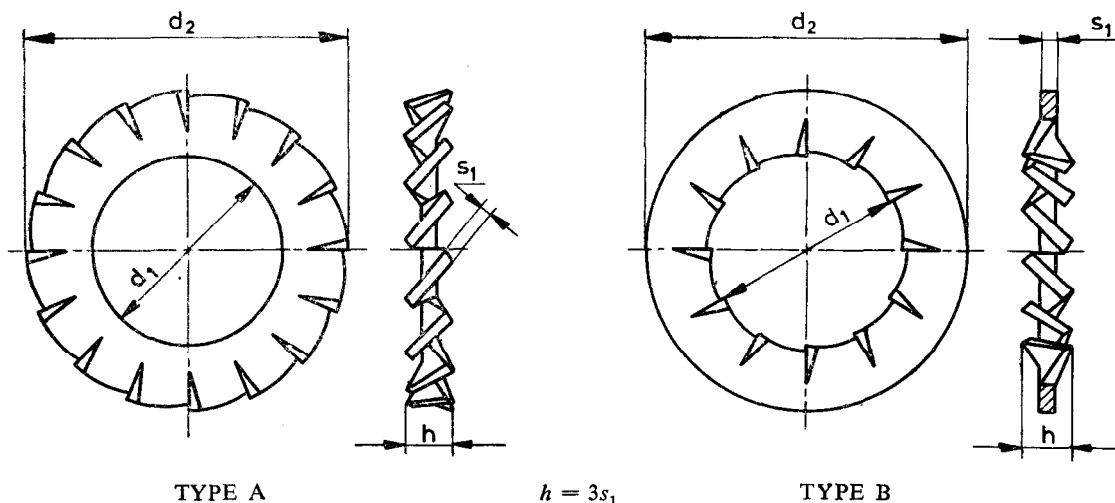
8.3.2 For other requirements not specified in this standard, the washers shall conform to IS 5369 : 1975.

8.4 Sampling and Acceptance

Shall be according to IS 6821 : 1973.

Table 1 Dimensions for Serrated Lock Washers — Types A and B
(Clause 5.1)

All dimensions in millimetres.



Nominal Size	d_1	d_2	s_1	Number of Teeth, Min		For Screw Thread Size
	H13	h14	*	Type A	Type B	
1.6	1.8	3.6	0.3	9	7	1.6
2	2.4	4.5	0.3	9	7	2
2.5	2.9	5.5	0.4	9	7	2.5
3	3.4	6	0.4	9	7	3
3.5	3.9	7	0.5	10	8	3.5
4	4.5	8	0.5	11	8	4
5	5.5	10	0.6	11	8	5
6	6.6	11	0.7	12	9	6
7	7.7	12.5	0.8	14	10	7
8	9	15	0.8	14	10	8
10	11	18	0.9	16	12	10
12	13.5	20.5	1	16	12	12
14	15.5	24	1	18	14	14
16	17.5	26	1.2	18	14	16
18	20	30	1.4	18	14	18
20	22	33	1.4	20	16	20
22	24	36	1.5	20	16	22
24	27	38	1.5	20	16	24
27	30	44	1.6	22	18	27
30	33	48	1.6	22	18	30

*Tolerance for s_1 according to IS 513 : 1986.

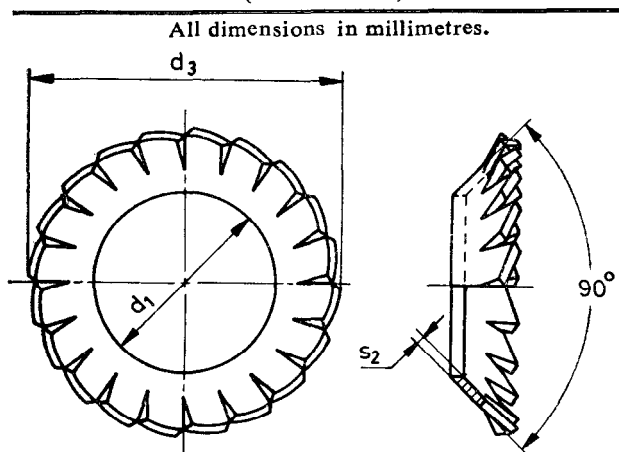
9 TESTS

9.1 Temper Test

Washers after being compressed to a height equal to the actual material thickness plus 0.127 mm and then released, shall have a free height greater than the compressed height.

Compression shall be accomplished between parallel flat surfaces for flat varieties of serrated lock washers and between mating countersunk holes and cones for countersunk serrated lock washers. The hardness of surfaces, between which the washers are compressed, shall be more than that of the washers under test.

Table 2 Dimensions for Serrated Lock Washers — Type C
(Clause 5.2)



Nominal Size	d_1 H13	d_3 ≈	s_2 *	Number of Teeth, Min	For Screw Thread Size
2	2.2	4.2	0.2	10	2
2.5	2.7	5.1	0.2	10	2.5
3	3.2	6	0.2	12	3
3.5	3.7	7	0.25	12	3.5
4	4.3	8	0.25	14	4
5	5.3	9.8	0.3	14	2
6	6.4	11.8	0.4	16	6
8	8.4	15.3	0.4	18	8
10	10.5	19	0.5	20	10
12	13	23	0.5	26	12
14	15	26.2	0.6	28	14
16	17	30.2	0.6	30	16

*Tolerance for s_1 according to IS 513 : 1986.

9.2 Spread Test

The rim of the serrated lock washer shall be cut or severed with a cold chisel or cutting pliers and severed ends shall be gripped by pliers or vice and pliers. Separation of the ends in the form of a helix to a distance equal to the inside diameter of the washer shall not result in fracture. When the ends are separated to a greater distance and the washer fractures, the structure at the point of fracture shall show a fine, grain, and the washer up to the instant of fracture shall deliver a tough springy reaction.

9.3 Embrittlement Test

Plated washers shall be clamped to a height equal to the actual material thickness plus 0.127 mm for a minimum period of 24 hours without breaking. The clamping shall be accomplished between parallel flat surfaces for flat varieties of serrated lock washers and between mating countersunk holes and cones for countersunk serrated lock washers. The hardness of surfaces, between which the washers are compressed, shall be more than that of washers under test.

10 MARKING

10.1 Each carton containing the lock washers shall be labelled with the indication of the service of manufacturer, type of washers and the quantity of the washers.

11 PACKING

11.1 Unless otherwise specified, the lock washers shall be packed in cartons of 100, 500, 1 000. Each carton shall contain a lock washer of one size only.

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Doc : No. LMD 14 (4972)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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